

mfitsio: Matlab Interface for the FITSIO Library. Reference Manual  
Version 1.0

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Sun Jan 26 00:19:26 2003



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# Chapter 1

## mfitsio: Matlab Interface for the FITSIO Library. Compound Index

### 1.1 mfitsio: Matlab Interface for the FITSIO Library. Compound List

Here are the classes, structs, unions and interfaces with brief descriptions:

<b>mfitsio_header</b> (This structure stores an entire extracted header) . . . . .	5
<b>mfitsio_info</b> (This structure stores information about a FITS data array or a MATLAB image) . . . . .	7
<b>mfitsio_record</b> (This structure holds keyword information extracted from a FITS file header) . . . . .	8



## Chapter 2

# mfitsio: Matlab Interface for the FITSIO Library. File Index

### 2.1 mfitsio: Matlab Interface for the FITSIO Library. File List

Here is a list of all files with brief descriptions:

<code>fits_delete_keyword.c ()</code>	9
<code>fits_read_header.c ()</code>	11
<code>fits_read_image.c ()</code>	12
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# Chapter 3

## mfitsio: Matlab Interface for the FITSIO Library. Class Documentation

### 3.1 mfitsio\_header Struct Reference

This structure stores an entire extracted header.

```
#include <mfitsio.h>
```

#### Public Attributes

- **mfitsio\_record \*\* records**
- **int length**

#### 3.1.1 Detailed Description

This structure stores an entire extracted header.

Definition at line 69 of file mfitsio.h.

#### 3.1.2 Member Data Documentation

##### 3.1.2.1 int mfitsio\_header::length

Definition at line 72 of file mfitsio.h.

Referenced by mfitsio\_adapt\_fheader(), mfitsio\_free\_header(), and mfitsio\_read\_header().

##### 3.1.2.2 mfitsio\_record\*\* mfitsio\_header::records

Definition at line 71 of file mfitsio.h.

Referenced by mfitsio\_adapt\_fheader(), mfitsio\_free\_header(), and mfitsio\_read\_header().

The documentation for this struct was generated from the following file:

- **mfitsio.h**

## 3.2 mfitsio\_info Struct Reference

This structure stores information about a FITS data array or a MATLAB image.

```
#include <mfitsio.h>
```

### Public Attributes

- int **naxis**
- int \* **naxes**
- int **bitpix**

#### 3.2.1 Detailed Description

This structure stores information about a FITS data array or a MATLAB image.

Definition at line 79 of file mfitsio.h.

#### 3.2.2 Member Data Documentation

##### 3.2.2.1 int mfitsio\_info::bitpix

Definition at line 83 of file mfitsio.h.

Referenced by mfitsio\_calc\_info(), mfitsio\_read\_image(), mfitsio\_read\_info(), mfitsio\_write\_image(), and mfitsio\_write\_info().

##### 3.2.2.2 int\* mfitsio\_info::naxes

Definition at line 82 of file mfitsio.h.

Referenced by mfitsio\_calc\_info(), mfitsio\_free\_info(), mfitsio\_read\_image(), mfitsio\_read\_info(), mfitsio\_write\_image(), and mfitsio\_write\_info().

##### 3.2.2.3 int mfitsio\_info::naxis

Definition at line 81 of file mfitsio.h.

Referenced by mfitsio\_calc\_info(), mfitsio\_read\_image(), mfitsio\_read\_info(), mfitsio\_write\_image(), and mfitsio\_write\_info().

The documentation for this struct was generated from the following file:

- **mfitsio.h**

### 3.3 mfitsio\_record Struct Reference

This structure holds keyword information extracted from a FITS file header.

```
#include <mfitsio.h>
```

#### Public Attributes

- `char * key`
- `char * value`
- `int type`

##### 3.3.1 Detailed Description

This structure holds keyword information extracted from a FITS file header.

Definition at line 59 of file mfitsio.h.

##### 3.3.2 Member Data Documentation

###### 3.3.2.1 `char* mfitsio_record::key`

Definition at line 61 of file mfitsio.h.

Referenced by `mfitsio_free_record()`, and `mfitsio_parse_card()`.

###### 3.3.2.2 `int mfitsio_record::type`

Definition at line 63 of file mfitsio.h.

###### 3.3.2.3 `char* mfitsio_record::value`

Definition at line 62 of file mfitsio.h.

Referenced by `mfitsio_adapt_frecord()`, `mfitsio_free_record()`, and `mfitsio_parse_card()`.

The documentation for this struct was generated from the following file:

- `mfitsio.h`

## Chapter 4

# mfitsio: Matlab Interface for the FITSIO Library. File Documentation

### 4.1 fits\_delete\_keyword.c File Reference

```
#include <string.h>
#include <stdio.h>
#include <fitsio.h>
#include <malloc.h>
#include "mex.h"
#include "matrix.h"
#include "mfitsio.h"
```

#### Functions

- void **mexFunction** (int nlhs, mxArray \*plhs[], int nrhs, const mxArray \*prhs[])  
*Executes the fits\_delete\_keyword function.*

#### 4.1.1 Function Documentation

##### 4.1.1.1 void mexFunction (int *nlhs*, mxArray \* *plhs*[], int *nrhs*, const mxArray \* *prhs*[])

Executes the fits\_delete\_keyword function.

Type "help fits\_delete\_keyword" for more information.

#### Parameters:

*nlhs* The total number of output arguments.

*plhs* The output arguments.

*nrhs* The total number of input arguments.

*prhs* The input arguments.

Definition at line 48 of file fits\_delete\_keyword.c.

## 4.2 fits\_read\_header.c File Reference

```
#include <string.h>
#include <stdio.h>
#include <fitsio.h>
#include <malloc.h>
#include "mex.h"
#include "matrix.h"
#include "mfitsio.h"
```

### Functions

- void **mexFunction** (int nlhs, mxArray \*plhs[], int nrhs, const mxArray \*prhs[])  
*Executes the fits\_read\_header function.*

#### 4.2.1 Function Documentation

##### 4.2.1.1 void mexFunction (int *nlhs*, mxArray \* *plhs*[], int *nrhs*, const mxArray \* *prhs*[])

Executes the fits\_read\_header function.

Type "help fits\_read\_header" for more information.

#### Parameters:

- nlhs*** The total number of output arguments.
- plhs*** The output arguments.
- nrhs*** The total number of input arguments.
- prhs*** The input arguments.

Definition at line 48 of file fits\_read\_header.c.

### 4.3 fits\_read\_image.c File Reference

```
#include <string.h>
#include <stdio.h>
#include <fitsio.h>
#include <malloc.h>
#include "mex.h"
#include "matrix.h"
#include "mfitsio.h"
```

#### Functions

- void **mexFunction** (int nlhs, mxArray \*plhs[], int nrhs, const mxArray \*prhs[])
   
*Executes the fits\_read\_image function.*

#### 4.3.1 Function Documentation

##### 4.3.1.1 void mexFunction (int *nlhs*, mxArray \* *plhs*[], int *nrhs*, const mxArray \* *prhs*[])

Executes the fits\_read\_image function.

Type "help fits\_read\_image" for more information.

##### Parameters:

- nlhs*** The total number of output arguments.
- plhs*** The output arguments.
- nrhs*** The total number of input arguments.
- prhs*** The input arguments.

Definition at line 48 of file fits\_read\_image.c.

## 4.4 fits\_write\_header.c File Reference

```
#include <string.h>
#include <stdio.h>
#include <fitsio.h>
#include <malloc.h>
#include "mex.h"
#include "matrix.h"
#include "mfitsio.h"
```

### Functions

- void **mexFunction** (int nlhs, mxArray \*plhs[], int nrhs, const mxArray \*prhs[])  
*Executes the fits\_write\_header function.*

#### 4.4.1 Function Documentation

##### 4.4.1.1 void mexFunction (int *nlhs*, mxArray \* *plhs*[], int *nrhs*, const mxArray \* *prhs*[])

Executes the fits\_write\_header function.

Type "help fits\_write\_header" for more information.

#### Parameters:

- nlhs*** The total number of output arguments.
- plhs*** The output arguments.
- nrhs*** The total number of input arguments.
- prhs*** The input arguments.

Definition at line 48 of file fits\_write\_header.c.

## 4.5 fits\_write\_image.c File Reference

```
#include <string.h>
#include <stdio.h>
#include <fitsio.h>
#include <malloc.h>
#include "mex.h"
#include "matrix.h"
#include "mfitsio.h"
```

### Functions

- void **mexFunction** (int nlhs, mxArray \*plhs[], int nrhs, const mxArray \*prhs[])
   
*Executes the fits\_write\_image function.*

#### 4.5.1 Function Documentation

##### 4.5.1.1 void mexFunction (int *nlhs*, mxArray \* *plhs*[], int *nrhs*, const mxArray \* *prhs*[])

Executes the fits\_write\_image function.

Type "help fits\_write\_image" for more information.

#### Parameters:

- nlhs*** The total number of output arguments.
- plhs*** The output arguments.
- nrhs*** The total number of input arguments.
- prhs*** The input arguments.

Definition at line 48 of file fits\_write\_image.c.

## 4.6 mfitsio.c File Reference

```
#include <string.h>
#include <stdio.h>
#include <fitsio.h>
#include <malloc.h>
#include <unistd.h>
#include "mex.h"
#include "matrix.h"
#include "mfitsio.h"
```

### Functions

- void **mfitsio\_free\_record** (mfitsio\_record \*record)  
*Deallocates a mfitsio\_record (p. 8) structure.*
- void **mfitsio\_free\_header** (mfitsio\_header \*header)  
*Deallocates a mfitsio\_header (p. 5) structure.*
- void **mfitsio\_free\_info** (mfitsio\_info \*info)  
*Deallocates a mfitsio\_info (p. 7) structure.*
- mfitsio\_record \* **mfitsio\_parse\_card** (const char \*cardtext)  
*Parses a fits header "card".*
- mfitsio\_header \* **mfitsio\_read\_header** (const char \*filename)  
*Reads a header from a fits file.*
- mxArray \* **mfitsio\_adapt\_frecord** (const mfitsio\_record \*record)  
*Adapts a mfitsio\_record (p. 8) structure into a MATLAB variable.*
- mxArray \* **mfitsio\_adapt\_fheader** (const mfitsio\_header \*header)  
*Adapts a mfitsio\_header (p. 5) structure into a MATLAB struct array.*
- mfitsio\_info \* **mfitsio\_read\_info** (const char \*filename)  
*The dimensions and bitpix are acquired from the FITS file header.*
- mxArray \* **mfitsio\_read\_image** (const char \*filename, const mfitsio\_info \*info)  
*Read a FITS image and store the result in a MATLAB array.*
- void **mfitsio\_write\_image** (const char \*filename, const mxArray \*header, mxArray \*img)  
*Write a MATLAB array/image to a FITS file.*
- void **mfitsio\_delete\_keyword** (const char \*filename, const char \*keyword)  
*Delete a record from a header in a FITS file.*
- void **mfitsio\_write\_header** (const char \*filename, const mxArray \*header)

*Write header information stored in a MATLAB struct array to a FITS file.*

- void **mfitsio\_write\_info** (fitsfile \*fptr, const **mfitsio\_info** \*info)  
*Write bitpix and dimension information to a FITS header.*
- **mfitsio\_info** \* **mfitsio\_calc\_info** (const mxArray \*img)  
*Calculate bitpix and dimension information from a MATLAB image.*
- int **mfitsio\_is\_scalar** (const mxArray \*array)  
*Determine whether the MATLAB array is singleton.*
- int **mfitsio\_forbidden** (const char \*s)  
*This function determines whether modifying a certain header keyword is allowed.*
- int **mfitsio\_ignore\_card** (const char \*s)  
*This function determines whether modifying a certain header keyword is allowed.*
- mxArray \* **mfitsio\_get\_mfield** (const mxArray \*array, int index, const char \*field\_name)  
*A wrapper function for mxGetField.*
- double **mfitsio\_get\_mscalar** (const mxArray \*array)  
*A wrapper function for mxGetScalar.*

#### 4.6.1 Function Documentation

##### 4.6.1.1 mxArray\* **mfitsio\_adapt\_fheader** (const **mfitsio\_header** \* *record*)

Adapts a **mfitsio\_header** (p. 5) structure into a MATLAB struct array.

**Parameters:**

*header* The header to adapt.

**Returns:**

A MATLAB struct object corresponding to the parsed **mfitsio\_header** (p. 5).

Definition at line 443 of file mfitsio.c.

##### 4.6.1.2 mxArray\* **mfitsio\_adapt\_frecord** (const **mfitsio\_record** \* *record*)

Adapts a **mfitsio\_record** (p. 8) structure into a MATLAB variable.

The syntax of the text of the value determines the type of the MATLAB variable.

**Parameters:**

*record* The record to adapt.

**Returns:**

A MATLAB variable.

Definition at line 326 of file mfitsio.c.

#### 4.6.1.3 mfitsio\_info\* mfitsio\_calc\_info (const mxArray \* *img*)

Calculate bitpix and dimension information from a MATLAB image.

**Parameters:**

*img* The MATLAB array where the image is stored.

**Returns:**

A **mfitsio\_info** (p. 7) struct containing the bitpix and dimension information.

Definition at line 1069 of file mfitsio.c.

#### 4.6.1.4 void mfitsio\_delete\_keyword (const char \* *filename*, const char \* *keyword*)

Delete a record from a header in a FITS file.

**Parameters:**

*filename* The filename of the FITS file.

*keyword* The keyword of the record to delete.

Definition at line 779 of file mfitsio.c.

#### 4.6.1.5 int mfitsio\_forbidden (const char \* *s*)

This function determines whether modifying a certain header keyword is allowed.

The reason for checking is that we do not want users modifying NAXIS, BITPIX, and other important headers as they can be calculated from a MATLAB image. Thus, the situation where the dimension and bitpix keywords differ from the stored image is avoided.

**Parameters:**

*array* The MATLAB variable to check for singleton dimensions.

**Returns:**

True if the array is a scalar.

Definition at line 1173 of file mfitsio.c.

#### 4.6.1.6 void mfitsio\_free\_header (mfitsio\_header \* *header*)

Deallocates a **mfitsio\_header** (p. 5) structure.

**Parameters:**

*header* The record you wish to deallocate.

Definition at line 67 of file mfitsio.c.

**4.6.1.7 void mfitsio\_free\_info (mfitsio\_info \* *info*)**

Deallocates a **mfitsio\_info** (p. 7) structure.

**Parameters:**

*info* The info you wish to deallocate.

Definition at line 84 of file mfitsio.c.

**4.6.1.8 void mfitsio\_free\_record (mfitsio\_record \* *record*)**

Deallocates a **mfitsio\_record** (p. 8) structure.

**Parameters:**

*record* The record you wish to deallocate.

Definition at line 54 of file mfitsio.c.

**4.6.1.9 mxArray\* mfitsio\_get\_mfield (const mxArray \* *array*, int *index*, const char \* *field\_name*)**

A wrapper function for mxGetField.

Whenever a field cannot be retrieved, an error is reported and execution aborts.

**Parameters:**

*array* The MATLAB struct array.

*index* The index for the record.

*field\_name* The key for the record.

**Returns:**

The value of the field requested.

Definition at line 1210 of file mfitsio.c.

**4.6.1.10 double mfitsio\_get\_mscalar (const mxArray \* *array*)**

A wrapper function for mxGetScalar.

Whenever a scalar cannot be retrieved, zero is returned.

**Parameters:**

*array* The MATLAB struct array.

*index* The index for the record.

*field\_name* The key for the record.

**Returns:**

The numeric value as a double.

Definition at line 1240 of file mfitsio.c.

**4.6.1.11 int mfitsio\_ignore\_card (const char \* *s*)**

This function determines whether modifying a certain header keyword is allowed.

The reason for checking is that we do not want users modifying NAXIS, BITPIX, and other important headers as they can be calculated from a MATLAB image. Thus, the situation where the dimension and bitpix keywords differ from the stored image is avoided.

**Parameters:**

*array* The MATLAB variable to check for singleton dimensions.

**Returns:**

True is the array is a scalar.

Definition at line 1192 of file mfitsio.c.

Referenced by mfitsio\_parse\_card().

**4.6.1.12 int mfitsio\_is\_scalar (const mxArray \* *array*)**

Determine whether the MATLAB array is singleton.

**Parameters:**

*array* The MATLAB variable to check for singleton dimensions.

**Returns:**

True is the array is a scalar.

Definition at line 1136 of file mfitsio.c.

**4.6.1.13 mfitsio\_record\* mfitsio\_parse\_card (const char \* *cardtext*)**

Parses a fits header "card".

Comments are ignored. A **mfitsio\_record** (p. 8) structure is returned. When this structure is no longer needed, it should be deallocated.

**Parameters:**

*cardtext* The text of the fits header card.

**Returns:**

A **mfitsio\_record** (p. 8) structure containing the key and value which was parsed from the card. NULL is returned if the field is to be ignored or if the card is a comment line.

Definition at line 104 of file mfitsio.c.

**4.6.1.14 mfitsio\_header\* mfitsio\_read\_header (const char \* *filename*)**

Reads a header from a fits file.

Before the result of this function can be used by MATLAB, the header must be adapted to a MATLAB struct array using mfitsio\_adapt\_header function.

**Parameters:**

*filename* The filename of the fits file to read.

**Returns:**

A **mfitsio\_header** (p. 5) structure acquired by reading the header in the fits file.

Definition at line 221 of file mfitsio.c.

**4.6.1.15 mxArray\* mfitsio\_read\_image (const char \* *filename*, const mfitsio\_info \* *info*)**

Read a FITS image and store the result in a MATLAB array.

**Parameters:**

*filename* The filename of the FITS image.

*info* The dimensions and bitpix of the image.

**Returns:**

A **mfitsio\_info** (p. 7) struct containing the information.

Definition at line 570 of file mfitsio.c.

**4.6.1.16 mfitsio\_info\* mfitsio\_read\_info (const char \* *filename*)**

The dimensions and bitpix are acquired from the FITS file header.

**Parameters:**

*filename* The filename of the FITS file.

**Returns:**

A **mfitsio\_info** (p. 7) struct containing the information.

Definition at line 501 of file mfitsio.c.

**4.6.1.17 void mfitsio\_write\_header (const char \* *filename*, const mxArray \* *header*)**

Write header information stored in a MATLAB struct array to a FITS file.

**Parameters:**

*filename* The filename of the FITS file.

*header* The MATLAB struct array containing the information.

Definition at line 825 of file mfitsio.c.

**4.6.1.18 void mfitsio\_write\_image (const char \* *filename*, const mxArray \* *header*, mxArray \* *img*)**

Write a MATLAB array/image to a FITS file.

**Parameters:**

*filename* The filename of the FITS file.

*info* The MATLAB struct array representing the keywords to store.

*img* The MATLAB array/image to store in the FITS file.

Definition at line 692 of file mfitsio.c.

**4.6.1.19 void mfitsio\_write\_info (fitsfile \* *fptr*, const mfitsio\_info \* *info*)**

Write bitpix and dimension information to a FITS header.

**Parameters:**

*filename* The filename of the FITS file.

*info* The **mfitsio\_info** (p. 7) struct containing the dimension and bitpix information.

Definition at line 1024 of file mfitsio.c.

## 4.7 mfitsio.h File Reference

```
#include "mex.h"
#include "matrix.h"
```

### Compounds

- struct **mfitsio\_header**  
*This structure stores an entire extracted header.*
- struct **mfitsio\_info**  
*This structure stores information about a FITS data array or a MATLAB image.*
- struct **mfitsio\_record**  
*This structure holds keyword information extracted from a FITS file header.*

### Defines

- #define **MFITSIO\_WARN** mexWarnMsgTxt  
*Macro specifies which function to execute when a warning is reported.*
- #define **MFITSIO\_ERR** mexErrMsgTxt  
*Macro specifies which function to execute when an error is reported.*
- #define **MFITSIO\_PRINTF** mexPrintf  
*Macro specifies which function to execute when writing standard text.*
- #define **MFITSIO\_FREE** mxFree  
*Macro specifies which function to execute when freeing memory.*
- #define **MFITSIO\_MALLOC** mxMalloc  
*Macro specifies which function to execute when allocating memory using the malloc invocation syntax.*
- #define **MFITSIO\_CALLOC** mxCalloc  
*Macro specifies which function to execute when allocating memory using the calloc invocation syntax.*

### Functions

- void **mfitsio\_free\_record** (**mfitsio\_record** \*record)  
*Deallocates a **mfitsio\_record** (p. 8) structure.*
- void **mfitsio\_free\_header** (**mfitsio\_header** \*header)  
*Deallocates a **mfitsio\_header** (p. 5) structure.*
- void **mfitsio\_free\_info** (**mfitsio\_info** \*info)

*Deallocates a **mfitsio\_info** (p. 7) structure.*

- **mfitsio\_record \* mfitsio\_parse\_card** (const char \*cardtext)  
*Parses a fits header "card".*
- **mfitsio\_header \* mfitsio\_read\_header** (const char \*filename)  
*Reads a header from a fits file.*
- **mxArray \* mfitsio\_adapt\_frecord** (const **mfitsio\_record** \*record)  
*Adapts a **mfitsio\_record** (p. 8) structure into a MATLAB variable.*
- **mxArray \* mfitsio\_adapt\_fheader** (const **mfitsio\_header** \*record)  
*Adapts a **mfitsio\_header** (p. 5) structure into a MATLAB struct array.*
- **mfitsio\_info \* mfitsio\_read\_info** (const char \*filename)  
*The dimensions and bitpix are acquired from the FITS file header.*
- **mxArray \* mfitsio\_read\_image** (const char \*filename, const **mfitsio\_info** \*info)  
*Read a FITS image and store the result in a MATLAB array.*
- **void mfitsio\_write\_image** (const char \*filename, const mxArray \*header, mxArray \*img)  
*Write a MATLAB array/image to a FITS file.*
- **void mfitsio\_write\_header** (const char \*filename, const mxArray \*header)  
*Write header information stored in a MATLAB struct array to a FITS file.*
- **void mfitsio\_delete\_keyword** (const char \*filename, const char \*keyword)  
*Delete a record from a header in a FITS file.*
- **mfitsio\_info \* mfitsio\_calc\_info** (const mxArray \*img)  
*Calculate bitpix and dimension information from a MATLAB image.*
- **void mfitsio\_write\_info** (fitsfile \*fptr, const **mfitsio\_info** \*info)  
*Write bitpix and dimension information to a FITS header.*
- **int mfitsio\_is\_scalar** (const mxArray \*array)  
*Determine whether the MATLAB array is singleton.*
- **int mfitsio\_forbidden** (const char \*s)  
*This function determines whether modifying a certain header keyword is allowed.*
- **mxArray \* mfitsio\_get\_mfield** (const mxArray \*array, int index, const char \*field\_name)  
*A wrapper function for mxGetField.*
- **double mfitsio\_get\_msscalar** (const mxArray \*array)  
*A wrapper function for mxGetScalar.*

### 4.7.1 Define Documentation

#### 4.7.1.1 #define MFITSIO\_CALLOC mxCalloc

Macro specifies which function to execute when allocating memory using the calloc invocation syntax.

Definition at line 51 of file mfitsio.h.

Referenced by mfitsio\_adapt\_fheader(), and mfitsio\_write\_header().

#### 4.7.1.2 #define MFITSIO\_ERR mexErrMsgTxt

Macro specifies which function to execute when an error is reported.

Definition at line 37 of file mfitsio.h.

Referenced by mfitsio\_adapt\_fheader(), mfitsio\_calc\_info(), mfitsio\_delete\_keyword(), mfitsio\_get\_mfield(), mfitsio\_read\_header(), mfitsio\_read\_image(), mfitsio\_read\_info(), mfitsio\_write\_header(), mfitsio\_write\_image(), and mfitsio\_write\_info().

#### 4.7.1.3 #define MFITSIO\_FREE mxFree

Macro specifies which function to execute when freeing memory.

Definition at line 43 of file mfitsio.h.

Referenced by mfitsio\_free\_header(), mfitsio\_free\_info(), mfitsio\_free\_record(), mfitsio\_read\_header(), mfitsio\_read\_image(), mfitsio\_read\_info(), and mfitsio\_write\_image().

#### 4.7.1.4 #define MFITSIO\_MALLOC mxMalloc

Macro specifies which function to execute when allocating memory using the malloc invocation syntax.

Definition at line 47 of file mfitsio.h.

Referenced by mfitsio\_adapt\_fheader(), mfitsio\_adapt\_frecord(), mfitsio\_calc\_info(), mfitsio\_parse\_card(), mfitsio\_read\_header(), mfitsio\_read\_image(), mfitsio\_read\_info(), and mfitsio\_write\_image().

#### 4.7.1.5 #define MFITSIO\_PRINTF mexPrintf

Macro specifies which function to execute when writing standard text.

Definition at line 40 of file mfitsio.h.

Referenced by mfitsio\_calc\_info(), mfitsio\_delete\_keyword(), mfitsio\_get\_mfield(), mfitsio\_read\_header(), mfitsio\_read\_image(), mfitsio\_read\_info(), mfitsio\_write\_header(), mfitsio\_write\_image(), and mfitsio\_write\_info().

#### 4.7.1.6 #define MFITSIO\_WARN mexWarnMsgTxt

Macro specifies which function to execute when a warning is reported.

Definition at line 34 of file mfitsio.h.

Referenced by mfitsio\_write\_header().

## 4.7.2 Function Documentation

### 4.7.2.1 mxArray\* mfitsio\_adapt\_fheader (const mfitsio\_header \* record)

Adapts a **mfitsio\_header** (p. 5) structure into a MATLAB struct array.

**Parameters:**

*header* The header to adapt.

**Returns:**

A MATLAB struct object corresponding to the parsed **mfitsio\_header** (p. 5).

Definition at line 443 of file mfitsio.c.

Referenced by mexFunction().

### 4.7.2.2 mxArray\* mfitsio\_adapt\_frecord (const mfitsio\_record \* record)

Adapts a **mfitsio\_record** (p. 8) structure into a MATLAB variable.

The syntax of the text of the value determines the type of the MATLAB variable.

**Parameters:**

*record* The record to adapt.

**Returns:**

A MATLAB variable.

Definition at line 326 of file mfitsio.c.

### 4.7.2.3 mfitsio\_info\* mfitsio\_calc\_info (const mxArray \* img)

Calculate bitpix and dimension information from a MATLAB image.

**Parameters:**

*img* The MATLAB array where the image is stored.

**Returns:**

A **mfitsio\_info** (p. 7) struct containing the bitpix and dimension information.

Definition at line 1069 of file mfitsio.c.

Referenced by mfitsio\_write\_image().

### 4.7.2.4 void mfitsio\_delete\_keyword (const char \* filename, const char \* keyword)

Delete a record from a header in a FITS file.

**Parameters:**

*filename* The filename of the FITS file.

*keyword* The keyword of the record to delete.

Definition at line 779 of file mfitsio.c.

Referenced by mexFunction().

**4.7.2.5 int mfitsio\_forbidden (const char \* *s*)**

This function determines whether modifying a certain header keyword is allowed.

The reason for checking is that we do not want users modifying NAXIS, BITPIX, and other important headers as they can be calculated from a MATLAB image. Thus, the situation where the dimension and bitpix keywords differ from the stored image is avoided.

**Parameters:**

*array* The MATLAB variable to check for singleton dimensions.

**Returns:**

True if the array is a scalar.

Definition at line 1173 of file mfitsio.c.

Referenced by mfitsio\_delete\_keyword(), and mfitsio\_write\_header().

**4.7.2.6 void mfitsio\_free\_header (mfitsio\_header \* *header*)**

Deallocates a **mfitsio\_header** (p. 5) structure.

**Parameters:**

*header* The record you wish to deallocate.

Definition at line 67 of file mfitsio.c.

Referenced by mexFunction().

**4.7.2.7 void mfitsio\_free\_info (mfitsio\_info \* *info*)**

Deallocates a **mfitsio\_info** (p. 7) structure.

**Parameters:**

*info* The info you wish to deallocate.

Definition at line 84 of file mfitsio.c.

Referenced by mexFunction().

**4.7.2.8 void mfitsio\_free\_record (mfitsio\_record \* *record*)**

Deallocates a **mfitsio\_record** (p. 8) structure.

**Parameters:**

*record* The record you wish to deallocate.

Definition at line 54 of file mfitsio.c.

Referenced by mfitsio\_free\_header().

**4.7.2.9 mxArray\* mfitsio\_get\_mfield (const mxArray \* *array*, int *index*, const char \* *field\_name*)**

A wrapper function for mxGetField.

Whenever a field cannot be retrieved, an error is reported and execution aborts.

**Parameters:**

*array* The MATLAB struct array.

*index* The index for the record.

*field\_name* The key for the record.

**Returns:**

The value of the field requested.

Definition at line 1210 of file mfitsio.c.

**4.7.2.10 double mfitsio\_get\_mscalar (const mxArray \* *array*)**

A wrapper function for mxGetScalar.

Whenever a scalar cannot be retrieved, zero is returned.

**Parameters:**

*array* The MATLAB struct array.

*index* The index for the record.

*field\_name* The key for the record.

**Returns:**

The numeric value as a double.

Definition at line 1240 of file mfitsio.c.

Referenced by mfitsio\_write\_header().

**4.7.2.11 int mfitsio\_is\_scalar (const mxArray \* *array*)**

Determine whether the MATLAB array is singleton.

**Parameters:**

*array* The MATLAB variable to check for singleton dimensions.

**Returns:**

True is the array is a scalar.

Definition at line 1136 of file mfitsio.c.

Referenced by mfitsio\_write\_header().

**4.7.2.12 mfitsio\_record\* mfitsio\_parse\_card (const char \* *cardtext*)**

Parses a fits header "card".

Comments are ignored. A **mfitsio\_record** (p. 8) structure is returned. When this structure is no longer needed, it should be deallocated.

**Parameters:**

*cardtext* The text of the fits header card.

**Returns:**

A **mfitsio\_record** (p. 8) structure containing the key and value which was parsed from the card. NULL is returned if the field is to be ignored or if the card is a comment line.

Definition at line 104 of file mfitsio.c.

Referenced by mfitsio\_read\_header().

**4.7.2.13 mfitsio\_header\* mfitsio\_read\_header (const char \* *filename*)**

Reads a header from a fits file.

Before the result of this function can be used by MATLAB, the header must be adapted to a MATLAB struct array using mfitsio\_adapt\_fheader function.

**Parameters:**

*filename* The filename of the fits file to read.

**Returns:**

A **mfitsio\_header** (p. 5) structure acquired by reading the header in the fits file.

Definition at line 221 of file mfitsio.c.

Referenced by mexFunction().

**4.7.2.14 mxArray\* mfitsio\_read\_image (const char \* *filename*, const mfitsio\_info \* *info*)**

Read a FITS image and store the result in a MATLAB array.

**Parameters:**

*filename* The filename of the FITS image.

*info* The dimensions and bitpix of the image.

**Returns:**

A **mfitsio\_info** (p. 7) struct containing the information.

Definition at line 570 of file mfitsio.c.

Referenced by mexFunction().

**4.7.2.15 mfitsio\_info\* mfitsio\_read\_info (const char \* *filename*)**

The dimensions and bitpix are acquired from the FITS file header.

**Parameters:**

*filename* The filename of the FITS file.

**Returns:**

A **mfitsio\_info** (p. 7) struct containing the information.

Definition at line 501 of file mfitsio.c.

Referenced by mexFunction().

**4.7.2.16 void mfitsio\_write\_header (const char \* *filename*, const mxArray \* *header*)**

Write header information stored in a MATLAB struct array to a FITS file.

**Parameters:**

*filename* The filename of the FITS file.

*header* The MATLAB struct array containing the information.

Definition at line 825 of file mfitsio.c.

Referenced by mexFunction(), and mfitsio\_write\_image().

**4.7.2.17 void mfitsio\_write\_image (const char \* *filename*, const mxArray \* *header*, mxArray \* *img*)**

Write a MATLAB array/image to a FITS file.

**Parameters:**

*filename* The filename of the FITS file.

*info* The MATLAB struct array representing the keywords to store.

*img* The MATLAB array/image to store in the FITS file.

Definition at line 692 of file mfitsio.c.

Referenced by mexFunction().

**4.7.2.18 void mfitsio\_write\_info (fitsfile \* *fptr*, const mfitsio\_info \* *info*)**

Write bitpix and dimension information to a FITS header.

**Parameters:**

*filename* The filename of the FITS file.

*info* The **mfitsio\_info** (p. 7) struct containing the dimension and bitpix information.

Definition at line 1024 of file mfitsio.c.

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